

REMARKS

In the patent application, claims 1-23 are pending. In the office action, all pending claims are rejected.

Applicant has amended claims 1, 4, 11-23 and add new claims 24 and 25.

Claims 1, 11 have been amended to rearrange the wording in the claims.

Claim 4 has been amended to indicate the refined interval being that in the same enhancement layer. The support for the amendment can be found in Figure 2b where the interval II of the same enhancement layer is reduced in blocks 562, 582, 584, 592 and 594, for example.

Claims 11-18 have been amended to change “coding device”, “device” to “apparatus”. Claims 11, 13, 15 and 18 have been further amended to remove the method step from the apparatus claims.

Claims 19-23 have been amended to claim a computer readable medium.

New claims 24 and 25 claim an apparatus having various means to carry out the method steps in claims 1 and 3.

No new matter has been introduced.

At section 2 of the office action, claims 19-23 are rejected for claiming a software product. Applicant has amended those claims to claim a computer readable medium.

At section 4, claims 1-8 and 10-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *van der Schaar et al.* (U.S. Patent No. 6,788,740 B1, hereafter referred to as *Schaar*), in view of *Eshet et al.* (U.S. Patent Application Publication No. 20060244840 A1, hereafter referred to as *Eshet*). The Examiner cites *Eshet* for disclosing that the quantization steps in the enhancement layers become smaller and smaller. This feature is not new. We disclose it in our specification (p.1, lines 26-27). The Examiner also states that *Eshet* also discloses re-computing the reconstructed values.

At section 6, claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Schaar*, in view of *Eshet*, further in view of *Wu et al.* (U.S. Patent No. 6,700,933 B1,

hereafter referred to as *Wu*). The Examiner cites *Wu* for disclosing how to emit an interval value.

It is respectfully submitted that the invention as claimed in claim 1 has the limitations of

- 1) obtaining intervals at least partially based on a quantization step-size of an enhancement layer and reconstructed values of the enhancement layer coefficients associated with at least one of a plurality of layers including said enhancement layer, other enhancement layers and the base layer;
- 2) refining the intervals at least partially based on the relationship between the predicted values, the original coefficients and the intervals, and
- 3) re-computing the reconstructed values.

Schaar discloses a method for determining the all-zero bit planes in the enhancement layers and preventing them from being transmitted so as to improve the coding efficiency of the enhancement layer compression scheme (Abstract; col.3, lines 17-20 and lines 32-37).

In rejecting claim 1, the Examiner states that *Schaar* discloses obtaining the intervals at least partially based on a quantization step-size of an enhancement layer and reconstructed values of the enhancement layer coefficients associated with at least one of a plurality of layers including said enhancement layer, other enhancement layers and the base layer (col.3, line 56-col.4, line 10; col.4, lines 37-46); and refining the intervals at least partially based on the relationship between the predicted values, the original coefficients and the intervals (col.9, line 66-col.10, line 19).

At col.3, line 56-col.4, line 10, *Schaar* discloses:

A controller associated with the enhancement layer circuitry capable of receiving a quantization parameter associated with the base layer video data and determining therefrom at least one all-zero bit plane associated with at least one block of the enhancement layer video data, wherein the controller is capable of causing the

enhancement layer circuitry not to transmit the at least one all-zero bit plane to the streaming video receiver. According to one embodiment of the present invention, the quantization parameter is associated with a frame of the base layer video data. According to another embodiment of the present invention, the controller determines an upper boundary of a quantization parameter associated with the at least one block.

In the above paragraph, *Schaar* only discloses that the QP is associated with a frame of the base layer and the upper bound of QP associated with one or more blocks is determined.

At col.4, lines 37-46, *Schaar* discloses:

According to another embodiment of the present invention, the controller determines an upper boundary of a quantization parameter associated with the at least one block. According to yet another embodiment of the present invention, the controller is further capable of receiving a weighting matrix associated with the base-layer video data and determining the at least one all-zero bit plane as a function of the quantization parameter and the weighting matrix.

In the above paragraph, *Schaar* discloses determining the all-zero bit plane based on QP and a weighting matrix associated with the base layer.

At col.9, line 66-col.10, line 19, *Schaar* discloses:

Video encoder 114 uses the QP data and weighting matrix, if present, to determine the upper bounds on residue coefficient values in selected blocks of the enhancement layer data (step 415). To illustrate the upper boundary determination, consider the residue (res(i)) associated with the (DCT) transformed coefficients at the base-layer for the non-intra case (i.e., B and P-Macro-blocks) and QP H263:

$$\text{res}(i) < 2.5\text{QP}-1$$

$$Ubound(i) = 2.5QP-1$$

Similar upper boundaries can be determined for a different quantization rule (i.e., qcoeff determination) or another transform (e.g., wavelet). The lower bound for res(i) is always zero. If adaptive quantization plus frequency dependent weighting is used, QP in the previous equations may be substituted with $[(QP)W(i)]/16$, where W(i) is frequency dependent weighting, which varies per transformed coefficient. The upper bound for res[i] becomes $[(2.5(QP)W(i)]/16]-1$, when frequency dependent weighting is used.

In the above paragraph, *Schaar* discloses determining the residue res(i) associated with the transform coefficients of the base layer based on the QP and the weighting matrix W(i). The upper bounds of the residual transform coefficients may be compared in an FGS frame encoder with previously bit planes to determine the presence of all-zero planes in bit planes that are still to be transmitted. If the all-zero bit planes are present, their transmission may be suppressed (col.10, lines 20-34).

These method steps are summarized in blocks 405 – 420 (Figure 4).

Accordingly, even if res(i) is considered as being equivalent to the intervals, *Schaar* does not disclose reducing res(i). *Schaar* only uses the upper bounds on the coefficient values in the selected blocks in the enhancement layer data in order to detect the presence of the all-zero bit planes. *Schaar* does not reduce res(i) or its upperbound.

Schaar fails to disclose refining the intervals, even if res(i) is considered as intervals.

The Examiner cites *Eshet* for disclosing re-computing the reconstructed values and reducing the quantization step-size (paragraph [0027]).

In paragraph [0027], *Eshet* discloses:

An aspect of the invention is that the compressed representations of the media stream have the same format as the original medial layer data. For example, assuming that the original media stream is MPEG compliant. Such a media stream includes DCT coefficients that were quantized using a uniform quantizer that is characterized by an

original quantizer value. Re-quantizing the original media stream using various quantizing scales generates compressed representations of the media stream. The base media layer is generated by the largest (most coarse) quantizing scale, while other compressed representations of the original media stream (also referred to as intermediate media layers) are generated by re-quantizing the original media stream by quantizer values that are smaller than the base quantizing scale but larger than the original quantizing scale. Accordingly, each compressed representation of the original media stream is also MPEG compliant.

In the above paragraph, *Eshet* only discloses that the invention is MPEG compliant. *Eshet* does not disclose re-computing the reconstructed at least partially based on said refined interval.

Eshet is concerned with recovering a loss of some portions of a media stream in the transmission or storage of a scalable media stream (paragraph [0006]). In particular, *Eshet* discloses a method for reconstructing a p th enhancement layer from the $(p-1)$ th layer, where $p > 1$ (block 162, Figure 11; paragraph [0036]).

In sum, *Schaar* is concerned with preventing an all-zero bit plane from transmitting, and *Eshet* is concerned with recovering a lost enhancement layer using information from a lower layer. The claimed invention is concerned with selective bit removal from the binary representation of the coefficient value. *Eshet* has nothing to do with suppressing the all-zero bit plane in media stream in transmission. *Eshet* has nothing to do with selective bit removal from the binary representation of the coefficient value. *Schaar* has nothing to do with loss recovery. *Schaar* has nothing to do with selective bit removal from the binary representation of the coefficient value. Even when the method as disclosed in *Schaar* is combined with the method as disclosed in *Eshet*, one cannot derive the method of the claimed invention.

For the above reason, *Schaar*, in view of *Eshet*, fails to render the claims 1-8 and 10-23 obvious.

At section 5, claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Schaar*, in view of *Eshet* and further in view of *Wu et al.* (U.S. Patent No. 6,700,933 B1,

hereafter referred to as *Wu*). The Examiner cites *Wu* for disclosing that the interval has a center and the emitted value is one or zero.

It is respectfully submitted that claim 9 is dependent from claim 1 and recites feature not recited in claim 1. For reasons regarding claim 1 above, claim 9 is also distinguishable over the cited *Schaar*, *Eshet* and *Wu* references.

As for new claims 24 and 25, they have essentially the limitations of claims 1 and 3. For reasons regarding claims 1 and 3 above. Claims 24 and 25 are also distinguishable over over the cited *Schaar* and *Eshet* references.

CONCLUSION

Claims 1-25 are allowable. Early allowance of claims 1-25 is earnestly solicited.

Respectfully submitted,



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